

## EXPERIMENTING WITH FLIGHT

**OBJECTIVE:**

**The students will use the experimental design process to create a glider that will go the longest distance.**

**NGSS:** MS-PS2-2, MS-PS2-5, MS-PS3-3

**MATERIALS:**

- Bat Glider template (per student)
- Paper clips
- Different types of paper (copy, index, newspaper, construction, etc....)
- Scissors
- Tape
- Stopwatch
- Measuring tape or meter stick
- Experimenting with Flight Lab Sheet (per student)



**TIME:** 2-3 1-hour classes

## Teacher preparation

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- Prepare a testing area for students to test their gliders and measure the flight time and distance. You can set a measuring tape or meter sticks out for determining flight distance.
- Copy a bat template for each student or group.
- Gather all supplies.
- Copy lab sheet for each student or group.
- Optional: Copy rubric for assessment of students' work for each student or group.
- Optional: Copy Distance/Time chart and graph if covering 7.7AC for each student.

## Engage

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Have students watch the following two videos of bats in flight.

<https://www.youtube.com/watch?v=YTKNZDjSaXQ>

<https://www.nps.gov/subjects/bats/how-bats-fly.htm>

## Explore

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1. The teacher can choose to have students complete this activity individually or in groups.
2. Tell students they are going to be testing gliders (The gliders will represent bats) made out of paper.
3. Show students a prepared glider. Ask students what variables could affect the flight of the "bats". Answers will vary, but can include weight, where the weight is distributed, rudder position, position of the head, or the type of paper used.
4. Groups should come up with an investigation question or problem and decide on the materials they will need before they begin the experiment.
5. If the students have difficulty deciding on a problem to investigate, have the group brainstorm some possible variables that could be tested. Variables that could be tested could be the type of paper used, where the paper clips are placed, and the size or placement of the rudder. Teacher and/or students can also determine if speed,

distance, or time in the air will be measured. Students will create a graph to represent their data so students need to be sure their investigation will yield data that can be used in a graph.

6. Students will write the procedure, perform the investigation, and complete the investigation sheet.
7. As students complete their data chart, they will need to create a graph to present their data. To support TEKS 7.7AC, students could determine the speed of their gliders and graph those results. Students can use the Distance/Time data sheet provided.

## Evaluate

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Be sure to make time for students to share their results with other groups. Students could compare results if other groups investigated the same question or learn more about another experiment. Students can discuss what they might do differently if they perform the investigation again.

## Elaborate

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The teacher may want to students to explain what occurred with the glider by:

- Describing what forces and how those forces acted on the glider
- Explaining how this demonstrates Newton's Third Law
- Exploring balanced and unbalanced forces with Newton's First Law

## ELPS

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Students who need extra support can be paired with other students during the investigation. A simpler investigation can be decided on for students to participate in.